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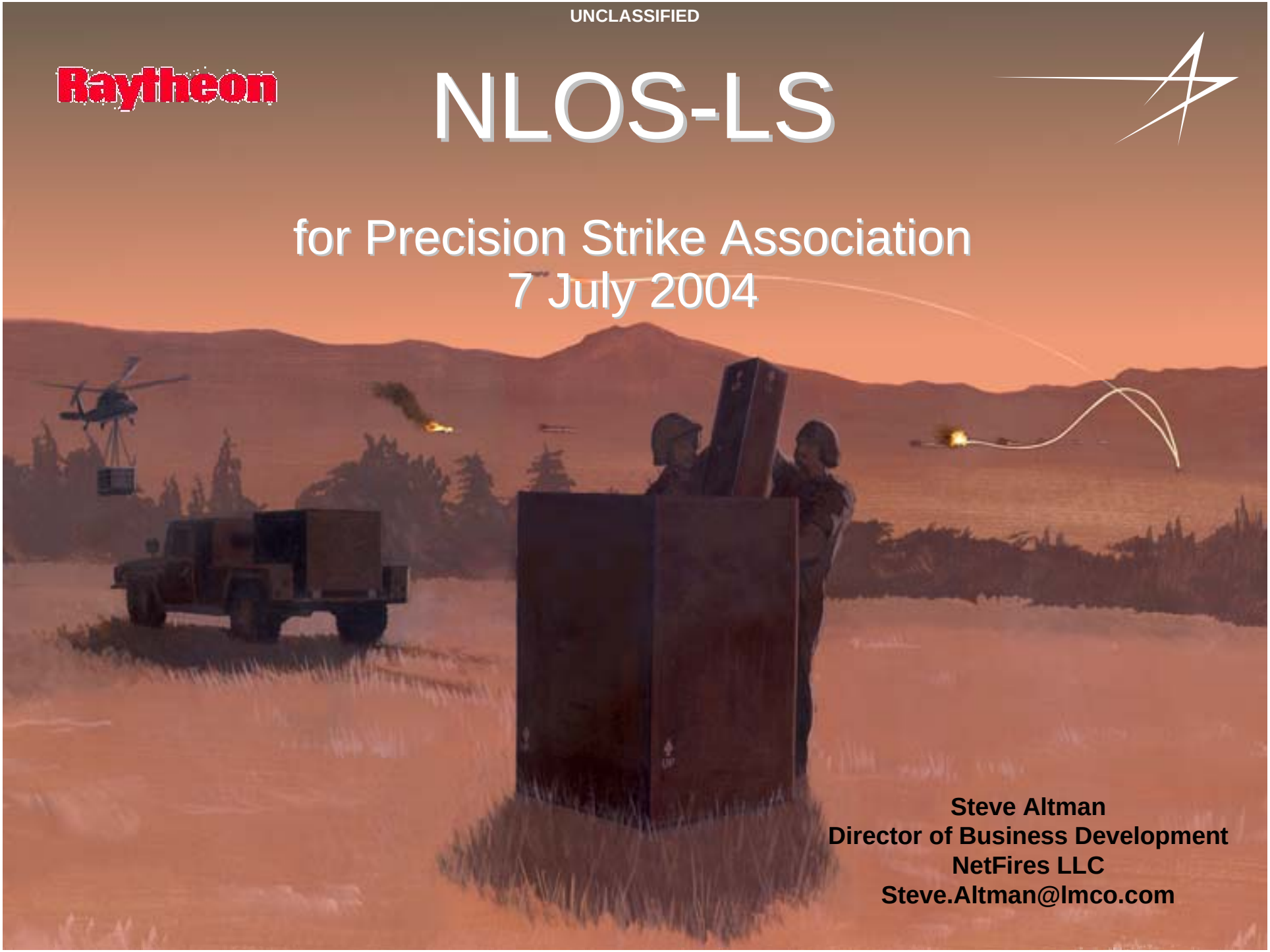
NLOS-LS

for Precision Strike Association
7 July 2004



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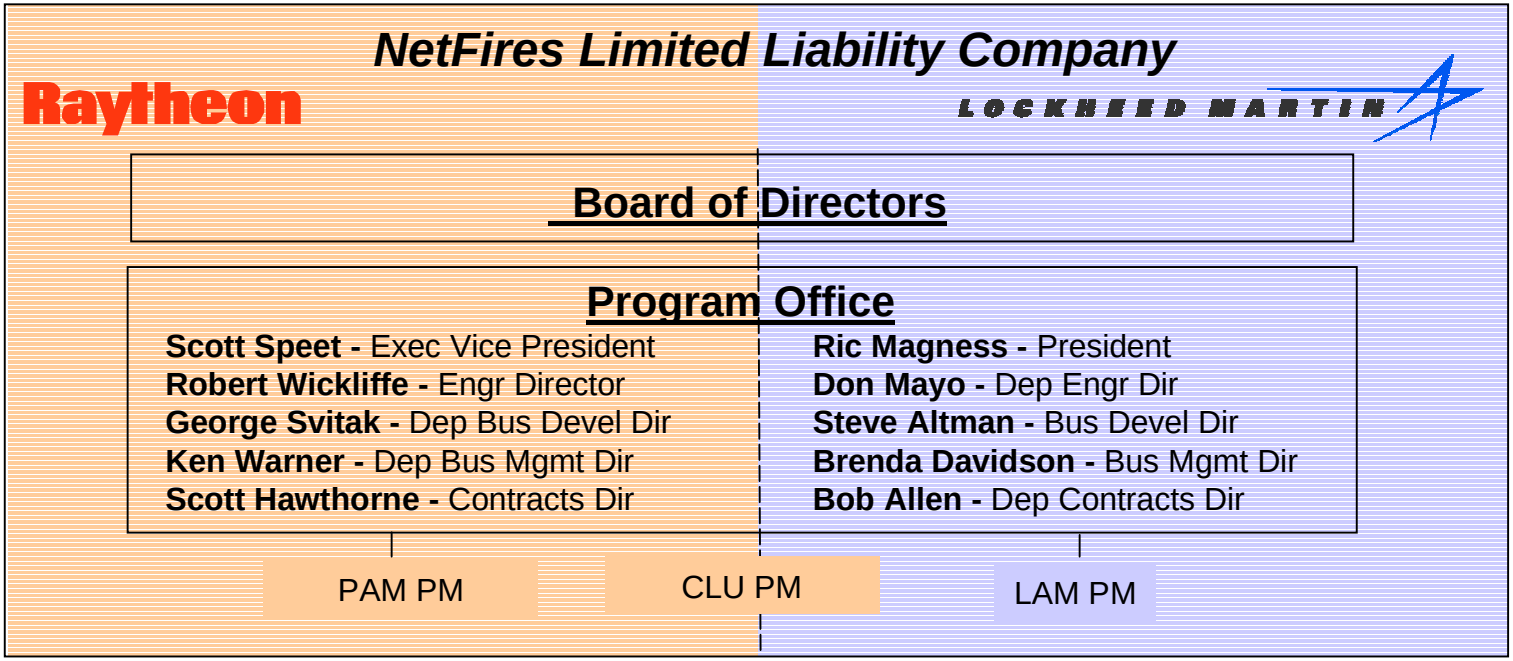
Industry Cooperation on NLOS-LS

Lockheed Martin and Raytheon Have Joined Forces Forming a 50/50 NetFires LLC to Produce NLOS-LS for the Army

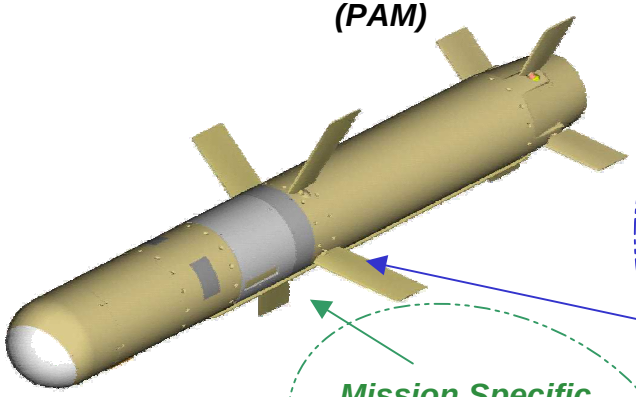
- **Sharing Resources, Experience**
- **Developing Commonality Between Missiles**
- **Political Strength to Maximize Program Support**
- **Collaboration And Sharing of Proprietary Data**



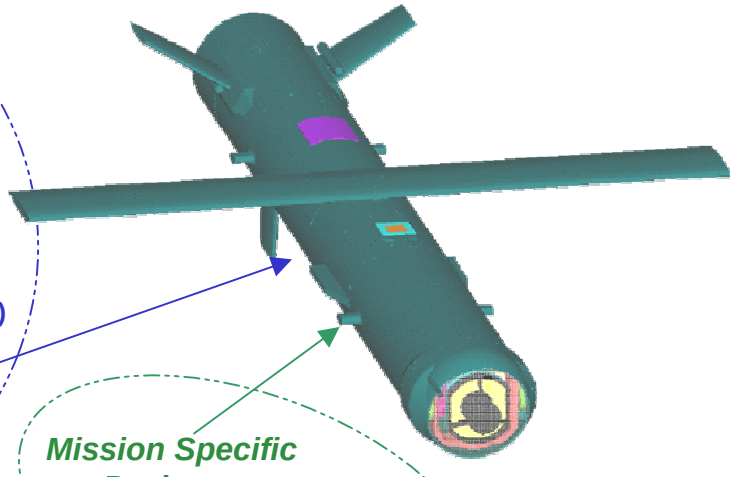
- **50/50 Workshare, Board, And Management**
- **Every Position has Peer in Partner Company**
- **Job Titles Rotate**

NLOS-LS Components

Precision Attack Missile (PAM)



Loitering Attack Missile (LAM)



LLC Mission Specific Common Components

GPS/Inertial Navigation
Network Radio
Launcher-Missile Interfaces
C2 Interface to FCS UA
Canister-Missile Interface
ESAF (Missiles only)
Control Actuation System (Missiles only)
Canister Housing *
CLU Base *
Canister Cover *
Test Connector *
Warhead *
AND GROWING

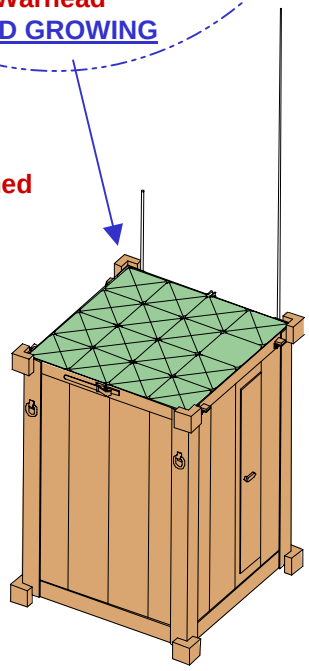
Mission Specific Packages

Solid Rocket Propulsion
Dual Mode Seeker

Mission Specific Packages

Solid Rocket Booster
Turbojet Engine
LADAR Seeker

*** New Since LLC Formed**



Container Launcher Unit (CLU)

NetFires LLC Development Program Cost Reducers

System Requirements Development
Common Subsystem Development
Specialty Engineering
Logistics Development
Common Simulation Environment
Special Test Equipment Development
Fully Integrated Test Program

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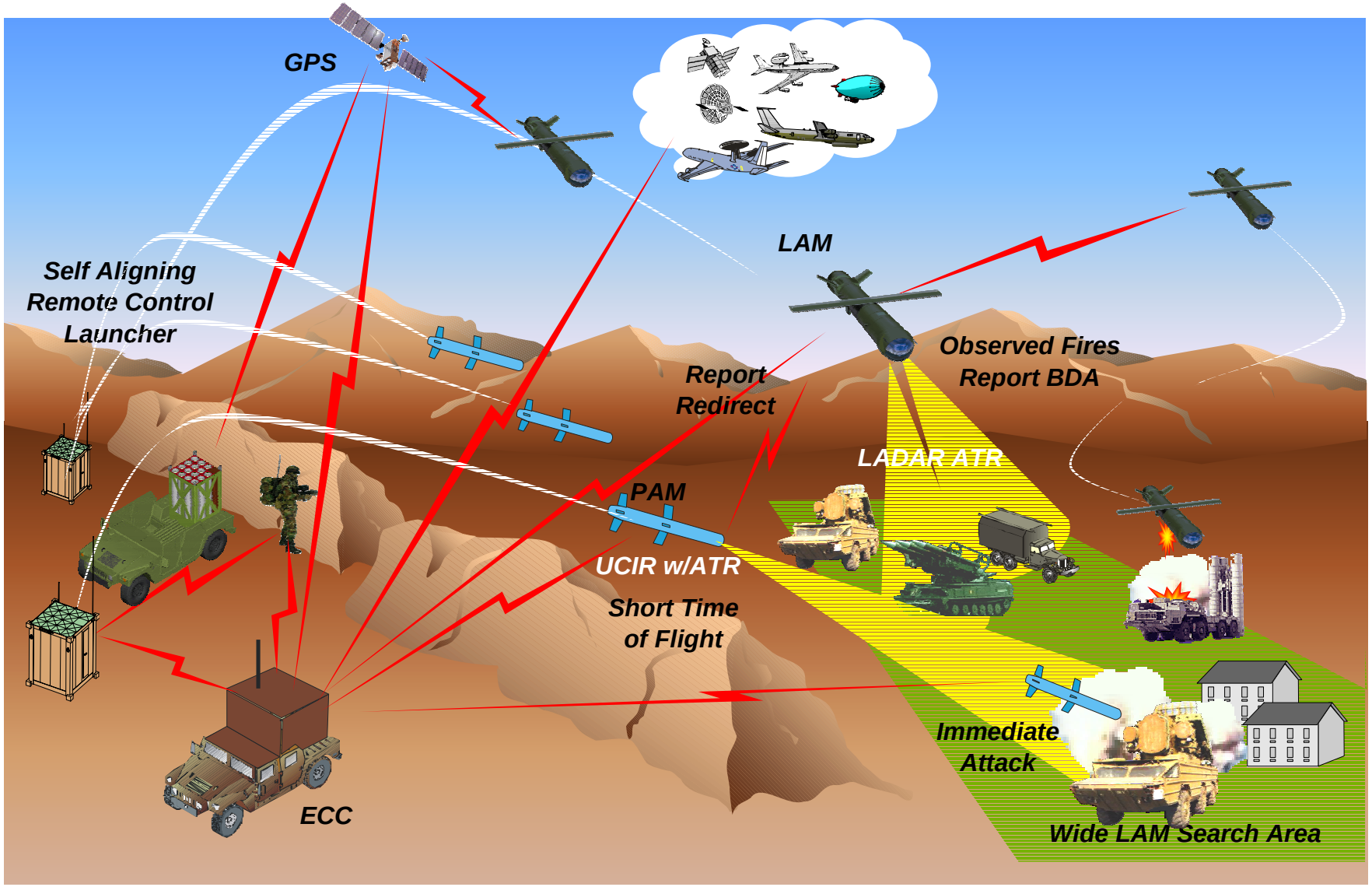
NLOS-LS Concept of Operation



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Development Roadmap for NLOS-LS

CY	03	04	05	06	07	08	09	10	11	12	13	14	

FCS MS B ◊ — NLOS-LS PDR ◊ — NLOS-LS CDR ◊ — FCS IPD1 ◊ — FCS IPD2 ◊ — FCS IOC ◊ — FCS FOC ◊ — FCS IOTE

Pre-SDD

Increment I SDD

Production

NLOS LS S&T Program

Ongoing R&D

Increment I

- Launcher - Platform Independent, C-130 RO/RO, Anti-Tamper
- LAM - Area search with limited ATR; high value targets
- PAM - Stationary and moving hard targets with network updates
- FCS network compatible missile data link
- Interoperability with FCS and legacy C4ISR network

S&T

- Increment 1 Risk Mitigation
  - Insensitive Munitions
  - ATR
  - Networking
- Future Forces
  - LAM/PAM Upgrades
  - Other Missile Variants

Technology Insertions

- Expand area search/loiter time
- Update HW/SW architectures
- Improve warhead lethality, non-lethal effects
- Improved GPS Anti-Jam
- Adverse weather performance

PAM: Current System

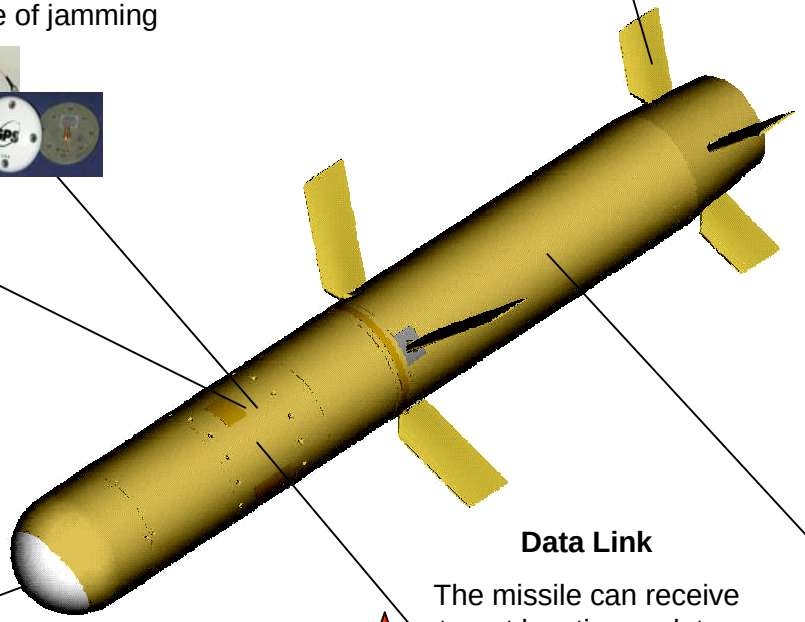
Anti-Jam GPS with Micro Electro Mechanical Inertial Measurement Unit

Allows the missile to navigate to a point where a target is even in the presence of jamming

Pop-Out Fins

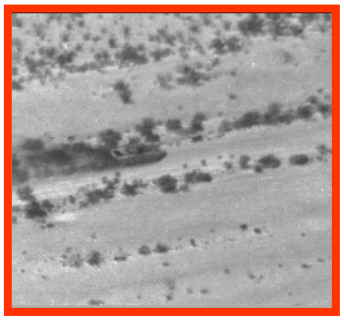
These steer the missile

Example of PAM launch



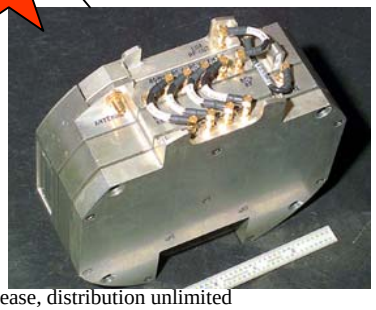
LASER and Uncooled Infrared Seeker

The missile can find a target on its own, or a soldier can designate a target with a laser



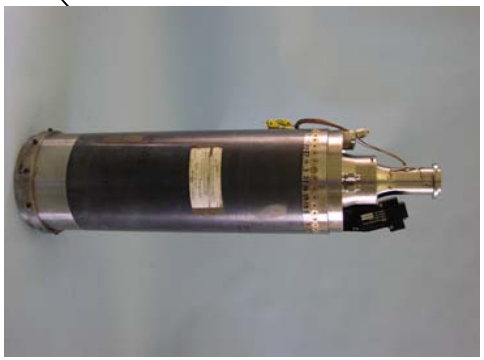
Data Link

The missile can receive target location updates while it is flying



Variable Thrust Rocket Motor

Allows the missile to go fast to nearby targets or to maximize range



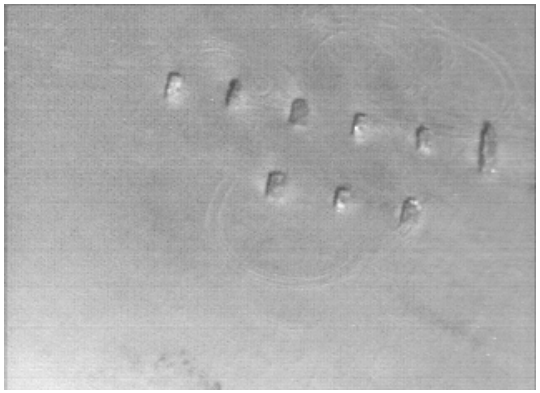
PAM GTV 2

PAM CFT 2 Results

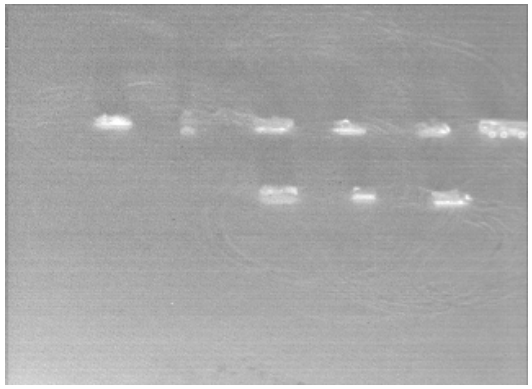
Test Helo

Typical Daytime Conditions

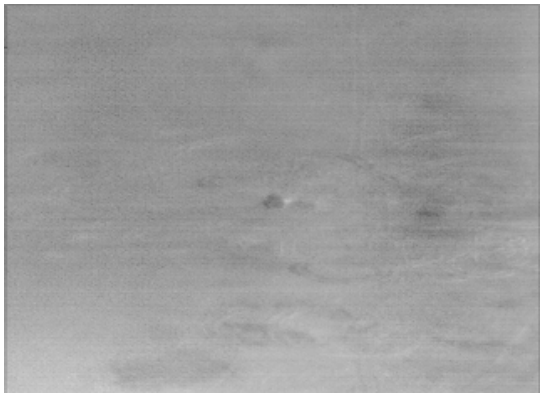
Form Factored NetFires PAM Seeker, GPS/INS and MEM



Target Array - Day



Target Array - Evening



GTV-1 Rehearsal

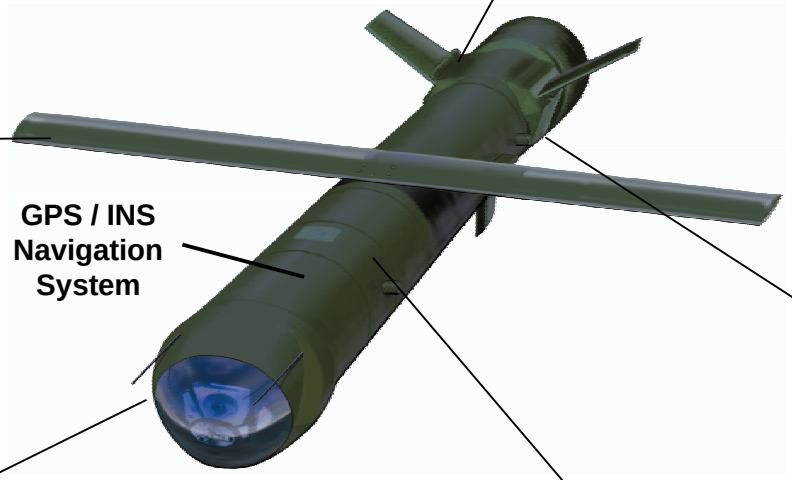
LAM: Current System

Fin Control Motors

Move the fins in response to commands from the autopilot

Deployable Wing

Is folded while in the launch tube, then deploys for flight

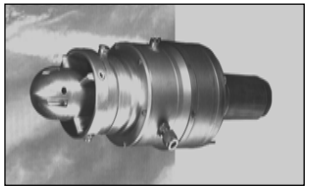


GPS / INS Navigation System

Example of LAM launch

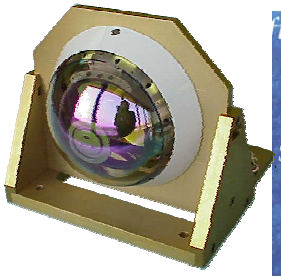
Turbojet Motor

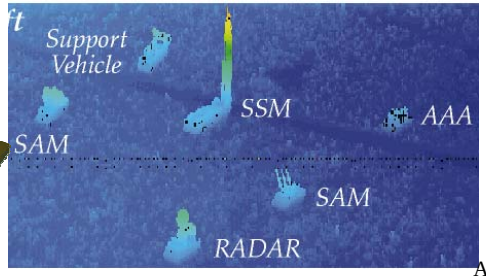
Provides propulsion during the horizontal flight of the missile



LADAR (Laser Radar) Seeker

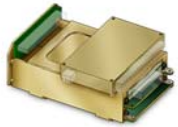
Produces a 3-D image of the target scene and is good at searching large areas for targets automatically





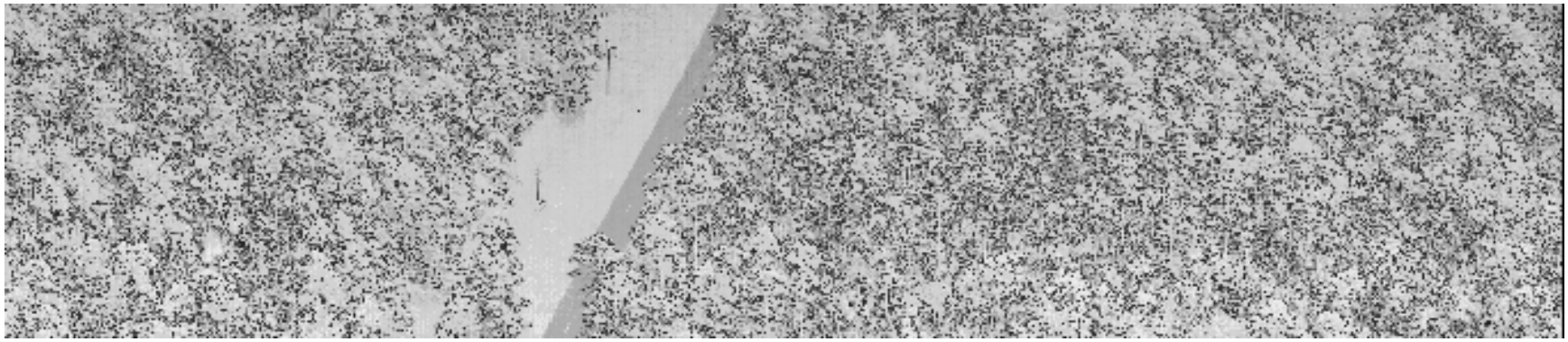
Data Link

Allows information to be passed to and from the missile in flight, including mission updates and images from the missile

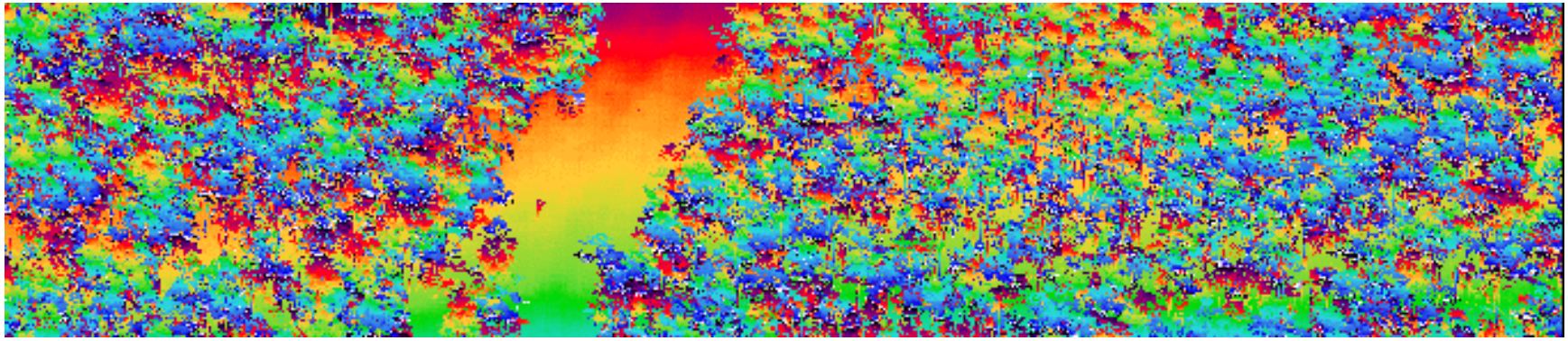


LAM CTV

LAM CFT Examples



Intensity Image…Videos are Faster Than Real Time



Height Above Ground Image, False Color Added…Videos are Faster Than Real Time

NLOS-LS Transportability

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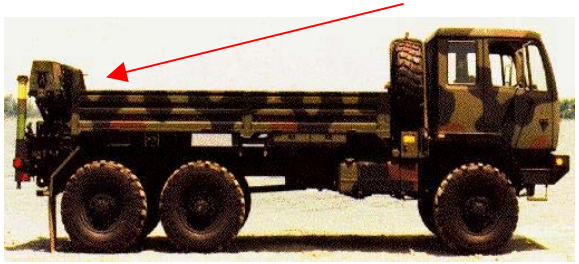
Platform Assumptions

- **Maximize number of munitions per plane load**
- **minimize system prep time**
- **Meet the intent of NLOS-LS ORD transportability requirements**
- **No or minimal impact to force structure**

Roll Off; 15 missiles

Roll Off: 45 missiles available for support

FMTV: M1085, 1086 with MHE



NLOS-LS Potential Platform Carrier:

FMTV: 3 CLU's
HEMTT:4 CLU's
HMMWV: 1 CLU

Overarching requirement is for NLOS-LS to be platform independent